

WHAT IS CLAIMED IS:

- 1 1. A steering system for a vehicle, a steering column of the steering system being
2 separated in a certain axial position into a stationary column portion on a steering gear
3 side and a movable column portion on a steering wheel side opposite to the steering gear
4 side, the steering system comprising:
 - 5 1) a tilt mechanism including a pivotal shaft which is disposed at a portion
6 substantially of the separation and extends substantially in a sidewise direction of the
7 vehicle, the tilt mechanism being adapted to pivot the movable column portion
8 substantially upward and downward around the pivotal shaft, the tilt mechanism
9 controlling the movable column portion to be secured in a certain upper pivotal position
10 and a certain lower pivotal position for a driving of the vehicle;
 - 11 2) a telescope mechanism adapted to pull out and push in substantially in a
12 forward-backward direction of the vehicle the movable column portion including the
13 pivotal shaft;
 - 14 3) a pop up mechanism for allowing the movable column portion to make a
15 popping up over substantially an uppermost pivotal position defined by the tilt
16 mechanism; and
 - 17 4) a pop up mechanism controlling mechanism for controlling the popping up of
18 the movable column portion by the pop up mechanism until the movable column portion
19 pulled out by the telescope mechanism has a certain length.
- 1 2. The steering system as claimed in claim 1, wherein
2 the pop up mechanism includes:
 - 3 1) a biasing member for biasing the movable column portion substantially in a
4 direction of the popping up,
 - 5 2) a tilt lever for controlling and releasing a tilting of the movable column portion,
6 the tilting being caused by the tilt mechanism,
 - 7 3) a stop state sensing means for sensing a stop state of the vehicle, and
8 4) an operation controller for mechanically controlling, based on a result given
9 by the stop state sensing means, the popping up of the movable column portion, and

10 the operation controller allows the popping up of the movable column portion in the
11 following states:

- 12 1) the stop state sensing means senses the stop state of the vehicle, and
- 13 2) the movable column portion is pulled out by the telescope mechanism to such
14 an extent as to have the certain length substantially in the backward direction of the
15 vehicle.

1 3. The steering system as claimed in claim 2, wherein

2 the stop state sensing means is a P-range sensing means of a shift lever of an
3 automatic transmission of the vehicle, the alphabetical P of the P-range standing for
4 parking.

1 4. The steering system as claimed in claim 3, wherein

2 the operation controller includes:

- 3 1) a lock plate disposed on a first side of the steering column in such a manner as
4 to make a pivotal movement,
- 5 2) an operation member fixed to the movable column portion, the operation
6 member being adapted to be disengaged from the lock plate for allowing a pivotal upper
7 movement of the movable column portion and to be engaged with the lock plate for
8 controlling the pivotal upper movement of the movable column portion, in accordance
9 with the pivotal movement of the lock plate, and
- 10 3) an actuator for engaging the lock plate with the operation member and
11 disengaging the lock plate from the operation member, by controlling a pivotal position of
12 the lock plate based on a sensing signal from the P-range sensing means, and
13 turning on the P-range sensing means so energizes the actuator as to disengage the
14 lock plate from the operation member, thus making the movable column portion pivotable
15 upward.

1 5. The steering system as claimed in claim 4, wherein

2 the pop up mechanism controlling mechanism includes:

- 3 1) an engagement portion disposed at a first end portion of the lock plate, and

4 2) a control portion disposed on the stationary column portion and extending
5 substantially in the forward-backward direction of the vehicle, and
6 until the movable column portion pulled out by the telescope mechanism has the
7 certain length or over, the control portion mechanically engages with the engagement
8 portion in such a manner as to keep engaging the lock plate with the operation member.

1 6. The steering system as claimed in claim 3, wherein
2 the steering system further comprises:

3 1) a pop up sensing switch for sensing the movable column portion that is in a
4 state of being popped up over a certain angle range, and

5 2) a shift lock mechanism for locking, based on an operation of the pop-up
6 sensing switch, the shift lever from shifting from the P-range to another speed range.

1 7. The steering system as claimed in claim 5, wherein

2 when the movable column portion is in a state of making the popping up, a first end
3 portion of the engagement portion blocks a guide hole defined substantially through a
4 hinge bracket which is mounted to a free end portion of a telescope jacket telescopically
5 mounted to the stationary column portion, thus preventing a head end portion of the
6 control portion from entering the guide hole.

1 8. The steering system as claimed in claim 1, wherein
2 the pivotal shaft is a tilt hinge shaft.

1 9. The steering system as claimed in claim 4, wherein
2 the operation member is a stopper plate.

1 10. A steering system, a telescope jacket being telescopically mounted to a stationary
2 column portion, a hinge bracket being mounted to a free end portion of the telescope
3 jacket, a movable column portion being pivotally mounted to the hinge bracket via a
4 pivotal shaft, the telescopic jacket in a telescopic position thereof substantially in an axial
5 direction being adjustable relative to the stationary column portion, the movable column
6 portion in an angular position thereof substantially in an upward-downward direction

7 being adjustable relative to the hinge bracket, a lock mechanism being provided for a
 8 locking operation and an unlocking operation in the telescopic position and the angular
 9 position, the movable column portion being adapted to make a popping up over a certain
 10 angle range for a tilting, the steering system comprising:

11 1) a control portion defining a track, comprising;

12 i) a base end portion fixed to the stationary column portion, and

13 ii) a head end portion which is a free end portion extending substantially in
 14 parallel to the telescope jacket,

15 2) a stopper plate fixed to the movable column portion, the stopper plate being
 16 pivotal around a pivotal shaft substantially integrally with the movable column portion,
 17 the stopper plate defining a track, and

18 3) an engagement portion pivotally supported to the hinge bracket, the
 19 engagement portion being biased to a direction for engaging with the stopper plate, the
 20 engagement portion including a first end portion and a second end portion,

21 with the second end portion on the track defined by the stopper plate, the
 22 first end portion being away from the track defined by the control portion,

23 with the second end portion away from the track defined by the stopper
 24 plate, the first end portion being on the track defined by the control portion,

25 with the telescope jacket in a position for becoming shorter than a
 26 certain length thereof, the control portion abutting on the first end portion of the
 27 engagement portion, thus stopping the second end portion of the engagement portion from
 28 being away from the track defined by the stopper plate, and

29 with the movable column portion in a position for making the popping
 30 up, the stopper plate abutting on the second end portion of the engagement portion, thus
 31 preventing the first end portion of the engagement portion from being away from the track
 32 defined by the control portion.

1 11. The steering system as claimed in claim 10, wherein

2 the steering system further comprises a lock plate pivotally supported to the hinge
 3 bracket, the lock plate including a first end portion which is biased in a direction for
 4 engaging with the stopper plate, the lock plate including a second end portion which

5 connects to an electromagnetic actuator, the electromagnetic actuator being operable when
6 sensing that a vehicle is not driving, and
7 the electromagnetic actuator sensing that the vehicle is not driving allows the lock
8 plate to pivot in such a manner as to be disengaged from an engagement position of the
9 stopper plate.

1 12. The steering system as claimed in claim 10, wherein
2 when the movable column portion is in a state of making the popping up, the first
3 end portion of the engagement portion blocks a guide hole defined substantially through
4 the hinge bracket, thus preventing the head end portion of the control portion from
5 entering the guide hole.

1 13. The steering system as claimed in claim 10, wherein
2 the pivotal shaft is a tilt hinge shaft.